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THESIS

**KEY ISSUES IN THE EMERGING U.S. DEBATE ON THE
COMPREHENSIVE TEST BAN TREATY**

by

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December 2009

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TEST BAN TREATY**

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ABSTRACT

This thesis analyzes both sides of the U.S. debate concerning the Comprehensive Test Ban Treaty (CTBT), which was rejected by the U.S. Senate in 1999, and which has attracted renewed interest under the Barack Obama administration. Significant events in international politics have changed the prospects of nuclear proliferation since 1999. Scientists and engineers have improved methods for verifying treaty compliance and ensuring the safety and reliability of U.S. nuclear weapons. Proponents of the CTBT continue to view it as crucial to nuclear non-proliferation efforts and effectively verifiable with minimal effects on the U.S. strategic deterrence posture. Meanwhile, skeptics regarding the treaty continue to view it as unverifiable and/or unenforceable and detrimental to U.S. strategic deterrence and non-proliferation efforts. Technical advancements alone are not likely to sway the opinions of senators who voted against CTBT ratification in 1999. If President Obama wishes to pursue CTBT ratification as he has stated, his administration will need to gain bipartisan support by compromising on some issues and establishing safeguards against the risks of the treaty.

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LIST OF ACRONYMS AND ABBREVIATIONS

CTBT	Comprehensive Test Ban Treaty
IAEA	International Atomic Energy Agency
MTCR	Missile Technology Control Regime
NPT	Treaty on the Non-Proliferation of Nuclear Weapons
NSG	Nuclear Suppliers Group
NSPD	National Security Presidential Directive
WMD	Weapons of Mass Destruction

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I. INTRODUCTION

A. MAJOR RESEARCH QUESTION

This thesis examines two questions. What are the different points of view about the key issues concerning U.S. ratification of the Comprehensive Test Ban Treaty (CTBT)? To what extent have new arguments been advanced since the United States Senate rejected the treaty in 1999? President Barack Obama has stated that he will pursue the Senate's advice and consent for ratification of the CTBT, which would prohibit all nuclear explosive testing. States party to the treaty would not be permitted to conduct nuclear explosive tests of any yield and would be subject to international verification regimes after the treaty entered into force. Proponents of the treaty argue that it would serve as a valuable tool for combating the proliferation of nuclear weapons and represent a significant step toward nuclear disarmament.¹ Opponents of the treaty argue that it would jeopardize the national security of the United States by eroding the credibility of its nuclear weapons, thereby decreasing the effectiveness of the U.S. deterrence posture and increasing the likelihood of nuclear proliferation.²

B. IMPORTANCE

If the Obama administration desires to secure ratification of the Comprehensive Test Ban Treaty prior to the May 2010 review conference for the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), the President will have to re-submit the treaty to the United States Senate for another round of debate toward that end. The debate will probably be contentious and will rely on the testimonies of senior leaders within the Department of Defense, the Department of Energy, and the scientific community. The results of a vote, if taken by the Senate, may or may not support ratification of the CTBT.

¹ Jonathan Medalia, *Comprehensive Test Ban Treaty: Pro and Con*, Congressional Research Service Report for Congress, RL20351 (Washington: Congressional Research Service, 28 June 2005), 2.

² Ibid.

Ten years have passed since the last Comprehensive Test Ban Treaty debate in the United States Senate. Technology has advanced, U.S. nuclear weapons have continued to age, and the geopolitical environment has changed dramatically. The arguments and analyses presented in 1999 will no longer suffice, and the importance of the CTBT to U.S. national security demands a new critical analysis of its pros and cons. It is therefore important for senior leaders within the Department of Defense to understand the key issues involved with the CTBT to make informed decisions and provide accurate counsel to decision-making authorities.

As with certain other international arms control measures, the Comprehensive Test Ban Treaty could result in reduced military capability, and this might affect U.S. central and extended deterrence policies. CTBT proponents maintain that other states would also sacrifice military capability because they also could no longer ensure the reliability of their weapons or develop improved warhead designs through testing. (This argument assumes that no significant testing could be undertaken without detection, and that detection would be followed by effective action to enforce compliance.) Inevitably, CTBT proponents argue, all states will be forced to replace aging weapons with newer, untested designs or to disband their nuclear arsenals completely. CTBT advocates favor the latter outcome because they regard the CTBT as an important step toward global nuclear disarmament. Skeptics regarding the CTBT have expressed concern that decisions to rely on untested designs or to abandon nuclear forces could affect strategic deterrence, upset the balance of international power, and endanger U.S. national security.

The Department of Defense must also consider the implications for its nuclear forces should the Comprehensive Test Ban Treaty enter into force. The United States has observed a moratorium on nuclear testing since 1992, but ratification of the Comprehensive Test Ban Treaty would have several political and military implications affecting the Department of Defense. The treaty's entry into force—or a continued moratorium on testing—could have long-term consequences for international security. CTBT advocates hold that the treaty would limit the nuclear aspirations of other nations,

thereby reducing international tensions and the threat of nuclear attacks. Opponents of the CTBT have argued that lack of nuclear testing could undermine the credibility of the U.S. nuclear deterrent and thereby increase the likelihood of future conflicts.

Strategic planners within the Department of Defense must account for the long-term effects of international arms control treaties, including the Comprehensive Test Ban Treaty. Realistic expectations regarding nuclear weapons performance should be factored into wartime contingency plans based on current numbers of deployed weapons and an accurate assessment of their probable capacity to destroy intended targets. The Department of Defense must also be prepared to deal with the more immediate effects of the Comprehensive Test Ban Treaty's entry into force, such as international on-site inspection teams and verification regimes.

C. PROBLEMS AND HYPOTHESIS

Testing has always been an important aspect of any weapons development program because it builds confidence in the reliability of system designs. The lack of comprehensive testing may eventually erode confidence in the reliability of nuclear weapons. As United States Secretary of Defense Robert Gates put it in October 2008, "there is absolutely no way we can maintain a credible deterrent and reduce the number of weapons in our [nuclear] stockpile without either resorting to testing our stockpile or pursuing a modernization program."³

The first problem presented by the Comprehensive Test Ban Treaty to its nuclear-armed states parties is how to maintain a credible deterrent without testing nuclear weapons. The United States Department of Energy has conducted its Stockpile Stewardship Program since 1996 in response to this problem.⁴ The deterrent value of U.S. nuclear weapons has not been profoundly affected by the moratorium on testing

³ Robert Gates, "Nuclear Weapons and Deterrence in the 21st Century," Speech at the Carnegie Endowment for International Peace, 28 October 2008: 6, available at http://www.carnegieendowment.org/files/1028_transcrip_gates_checked.pdf (accessed 6 August 2009).

⁴ Gene Aloise, *Nuclear Weapons: NNSA and DOD need to more effectively manage the stockpile life extension program*, Government Accountability Office Report 06-261 to the Subcommittee on Strategic Forces, Committee on Armed Services, House of Representatives, Natural Resources and Environment (Washington: Government Accountability Office, 2009), 1.

since 1992, mainly because the Secretary of Energy and the Secretary of Defense have certified the safety and reliability of all nine types of U.S. nuclear warheads every year since 1996.⁵ These certifications have been based largely on the results of the Stockpile Stewardship Program.

At some point in the future, however, the aging warheads could become unsafe or unreliable due to the decaying nature of the materials of which they are made. If the United States then wished to remain a nuclear power beyond that time period, it would be forced either to replace its stockpile with untested designs or to withdraw from the Comprehensive Test Ban Treaty in order to conduct nuclear explosive tests. Either choice would be likely to draw international criticism.

The Department of Defense would have to deal with the ramifications of the CTBT's ratification or entry into force or simply a continuation of the test moratorium. The deterioration of legacy nuclear weapons could have increasingly significant consequences in terms of safety, reliability, and budgetary costs. Strategic planners must also contend with a continuing decline in the overall number of deployable nuclear weapons due to international treaties, such as the projected new Strategic Arms Reduction Treaty with Russia. At some point in time, a loss of confidence or capability in nuclear forces may necessitate doctrinal changes in the guidance to the United States Strategic Command.

A build-up of conventional force capabilities might be required to preserve strategic deterrence in the absence of a credible nuclear threat. The Air Force and Navy would also need to continuously reassess their capabilities to destroy strategic targets. More redundant targeting of high-value targets might be required based on lower probabilities of kill by less reliable nuclear weapons, thereby reducing the overall effectiveness of U.S. strategic forces. Old warheads could also present a growing safety hazard to personnel that work on or near them.

⁵ Jonathan Medalia, *Nuclear Weapons: Comprehensive Nuclear Test Ban Treaty*, Congressional Research Service Report for Congress, IB92099 (Washington: Congressional Research Service, 22 March 2006), 10.

The United States may eventually decide to replace its aging nuclear arsenal with newer, untested warheads to maintain its strategic posture. Any new systems would be accompanied by changes in operations, force structures, budgets, safety procedures and security requirements. An interim mix of untested warhead designs and aging legacy systems could also bring its own set of challenges.

An additional problem the Comprehensive Test Ban Treaty would present to the United States is verification. The entry into force of the treaty would immediately subject the United States to international verification regimes. The Department of Defense would therefore have to plan for the possibility of on-site inspections on or near any of its installations with less than one week's notice. For example, Nellis Air Force Base could be inspected or over flown as part of an on-site inspection at the Department of Energy's Nevada Test Site.

This thesis investigates the hypothesis that there have been no significant new developments in the debate about the Comprehensive Test Ban Treaty since the United States Senate rejected it in 1999. The thesis reviews the arguments presented by proponents and opponents in 1999 and strives to identify new and revised arguments in the current debate.

D. HISTORICAL BACKGROUND

The concept of restricting nuclear testing has a long and storied history. Prominent scientists in the early years of the United States' nuclear programs, including Albert Einstein, Enrico Fermi and Robert Oppenheimer, expressed concern over the future consequences of nuclear testing.⁶ Nevertheless, the Cold War led to a nuclear arms race, during which hundreds of hydrogen bomb tests were conducted by the United States and the Soviet Union in the 1950s alone. The tests produced radioactive fallout

⁶ Herbert F. York, *The Advisors: Oppenheimer, Teller, and the Superbomb* (San Francisco: W.H. Freeman and Company, 1976), 64.

and spurred worldwide protests, which ultimately led to the Limited Test Ban Treaty of 1963.⁷ The Limited Test Ban Treaty banned nuclear explosions in the atmosphere, outer space, and water, but permitted underground weapons testing.

The Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty were negotiated in the 1970s to further limit underground nuclear weapons testing and non-weapons related testing. The two treaties were both ratified in 1990 and continue to limit underground explosive testing to 150 kilotons (approximately ten times the force of the Hiroshima explosion).⁸ The Hatfield amendment to the 1993 Energy and Water Appropriations Bill banned future United States nuclear testing of any yield unless another state tested nuclear explosives. The United States has not conducted any nuclear explosive tests since 1992, despite several subsequent tests by China, France, India, North Korea, and Pakistan.

The Hatfield amendment also required the President to work towards achieving a Comprehensive Test Ban Treaty no later than 1996. International negotiations on a comprehensive nuclear test ban had resumed in the late 1970s between the Union of Soviet Socialist Republics, the United Kingdom and the United States, but never gained significant momentum among the nuclear weapon states until after the end of the Cold War.⁹ The 1996 treaty's provisions ban nuclear explosions of any kind and create a technical secretariat to conduct on-site inspections and verify compliance through the International Monitoring System.¹⁰ Article I of the CTBT contains the basic obligations of the treaty:

1. Each State Party undertakes not to carry out any nuclear weapon test explosion or any other nuclear explosion, and to prohibit and prevent any such nuclear explosion at any place under its jurisdiction or control.

⁷ Medalia, *Nuclear Weapons: Comprehensive Nuclear Test Ban Treaty*, 1.

⁸ Ibid.

⁹ Keith A. Hansen, *The Comprehensive Nuclear Test Ban Treaty: An Insider's Perspective* (Stanford, CA: Stanford University Press, 2006), 7–8.

¹⁰ Medalia, *Nuclear Weapons: Comprehensive Nuclear Test Ban Treaty*, 7.

2. Each State Party undertakes, furthermore, to refrain from causing, encouraging, or in any way participating in, the carrying out of any nuclear weapon test explosion or any other nuclear explosion.¹¹

Entry into force requires signatures and ratifications from all forty-four states that possessed nuclear technology in 1996, referred to as "Annex 2 states" by the Comprehensive Test Ban Treaty Organization.¹² (Instruments of ratification are not required from non-Annex 2 states in order for the CTBT to enter into force.) Table 1 lists all states that have not ratified the CTBT as of November 2009, according to Annex 2 and signatory status.

STATUS	LIST OF STATES
Annex 2 (nuclear) states that have not signed	India, North Korea, Pakistan
Annex 2 (nuclear) states that have signed, but not ratified	China, Egypt, Indonesia, Iran, Israel, United States
Non-Annex 2 states that have not signed	Bhutan, Cuba, Dominica, Mauritius, Niue, Saudi Arabia, Somalia, Syria, Tonga, Tuvalu
Non-Annex 2 states that have signed, but not ratified	Angola, Brunei Darussalam, Central African Republic, Chad, Comoros, Congo, Equatorial Guinea, Gambia, Ghana, Guatemala, Guinea, Guinea-Bissau, Iraq, Marshall Islands, Myanmar, Nepal, Papua New Guinea, Sao Tome and Principe, Solomon Islands, Sri Lanka, Swaziland, Thailand, Timor-Leste, Trinidad and Tobago, Yemen, Zimbabwe

Table 1. States That Have Not Ratified the CTBT.¹³

¹¹ Comprehensive Test Ban Treaty Organization Web site, *The Comprehensive Test Ban Treaty*, 24 September 1996, available at http://www.ctbto.org/the-treaty/treaty_text/ (accessed 25 October 2009).

¹² Comprehensive Test Ban Treaty Organization Web site, "Status of signature and ratification," 23 September 2009, available at <http://www.ctbto.org/the-treaty/status-of-signature-and-ratification/> (accessed 16 October 2009).

¹³ Ibid.

President William Clinton was the first national leader to sign the treaty in 1996, but the United States Senate rejected its ratification in 1999.¹⁴ The George W. Bush administration did not support the Comprehensive Test Ban Treaty and thus did not resubmit it to the Senate despite significant international pressures. President Obama's recent speeches, notably his speech in April 2009 in Prague, indicate his desire to ratify the treaty and to convince the other eight Annex 2 states, whose ratification is required for the treaty's entry into force, to do so as well.¹⁵

In light of the President's intention to resubmit the treaty, the United States Senate is likely to engage in another round of debate regarding the Comprehensive Test Ban Treaty. This treaty has traditionally divided politicians and constituents alike. Some adamantly support the treaty; others are vehemently against it; and still others struggle with its pros and cons. The following discussion highlights some of the most prominent works of three types of literature in the CTBT debate.

E. LITERATURE REVIEW

The 1999 hearings in the U.S. Senate generated much of the discussion regarding the Comprehensive Test Ban Treaty and many reports, articles, and speeches have been written on the topic since that time. These include works of analysis by scholars assessing the issues, works of advocacy for and against U.S. ratification of the treaty, and compromise reports written by groups unable to reach a consensus, but nonetheless attempting to reach constructive conclusions and to offer useful recommendations.

¹⁴ Jonathan Medalia, *Nuclear Testing and Comprehensive Test Ban: Chronology Starting September 1992*, Congressional Research Service Report for Congress, 97-1007F, (Washington: Congressional Research Service, 9 June 2005), 3–4.

¹⁵ Barack Obama, "Remarks by President Barack Obama in Prague, Czech Republic," 5 April 2009, available at http://whitehouse.gov/the_press_office/ (accessed 10 June 2009).

The Government Accountability Office and the Congressional Research Service have prepared several objective scholarly analyses regarding the Comprehensive Test Ban Treaty. The Government Accountability Office has reported on the annual assessment of the safety, probable performance, and reliability of the U.S. nuclear stockpile. The Congressional Research Service reports have provided background information on current developments regarding the CTBT, the issues raised by the treaty, and updated safeguards and net assessments.

The Secretary of Defense, the Secretary of Energy, and several prominent scientists provided testimony in support of ratifying the Comprehensive Test Ban Treaty to the United States Senate in 1999. Nuclear arms control advocates view the treaty as an important part of nuclear non-proliferation regimes and a significant step toward global nuclear disarmament.¹⁶ Many technical experts believe that the Stockpile Stewardship Program can ensure long-term safety and reliability for U.S. nuclear weapons.¹⁷ Proponents of the Comprehensive Test Ban Treaty also argue that the international monitoring system is sufficient to detect any nuclear explosive testing of interest.¹⁸

Opponents of U.S. ratification of the Comprehensive Test Ban Treaty question (a) the ability of the international monitoring system to detect all relevant nuclear tests, and (b) the resolve of the United Nations Security Council to punish those that conduct nuclear tests. Opponents are also skeptical regarding the ability of the Stockpile Stewardship Program to preserve a safe and reliable nuclear force. The New Deterrent Working Group's 2009 report stated that aging nuclear warheads will eventually erode the credibility of the U.S. strategic posture and that "a weak American nuclear posture in fact encourages proliferation more than a strong one."¹⁹

¹⁶ George P. Shultz, William J. Perry, Henry A. Kissinger, and Samuel A. Nunn, "A World Free of Nuclear Weapons," *The Wall Street Journal*, January 4, 2007: A15.

¹⁷ *Technical Issues Related to the Comprehensive Test Ban Treaty*, John P. Holdren, Chairman, National Academy of Sciences (Washington: National Academy Press, 2002), 34.

¹⁸ *Ibid.*, 57–59.

¹⁹ The New Deterrent Working Group, *U.S. Nuclear Deterrence in the 21st Century* (Washington: Center for Security Policy Press, July 2009), 29.

There is also at least one commission whose members were unable to reach a consensus regarding the advisability of U.S. ratification of the Comprehensive Test Ban Treaty. The Congressional Commission on America's Strategic Posture was split in its assessment of the treaty's value to the United States; but nonetheless, attempted to provide constructive conclusions and useful recommendations in its 2009 report. This report demonstrates how contentious the CTBT ratification question could be in upcoming debates and outlines the importance of diplomatic safeguards and net assessments.²⁰

F. METHODS AND SOURCES

This thesis compares the U.S. debate on the Comprehensive Test Ban Treaty in 1999 with the arguments advanced today. Proponents and opponents of the Comprehensive Test Ban Treaty brought forth several arguments concerning the treaty in the years leading up to its ultimate rejection by the U.S. Senate in 1999. These arguments are compared with various current perspectives to determine whether any significant changes in the CTBT debate have emerged in the intervening decade. Historical testimonies and speeches from senior officials in the Department of Defense, the Department of Energy and the national laboratories since the end of the Cold War serve as primary sources of information. Other primary sources include works of analysis and advocacy concerning the implications for U.S. national security of CTBT ratification, as discussed in the literature review.

G. THESIS OVERVIEW

This thesis is organized as follows. Chapter II discusses the arguments advanced by CTBT proponents during the October 1999 hearings in the United States Senate. Chapter III outlines the arguments advanced by opponents of the treaty during the same hearings. Chapter IV compares data collected from recent articles, speeches, and reports with the arguments presented in 1999 to assess the extent to which new information or

²⁰ *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States*, William J. Perry, Chairman, James R. Schlesinger, Vice-Chairman (Washington: United States Institute of Peace Press, 2009), 87.

arguments have emerged. Chapter V examines the current composition of the United States Senate and the potential political dynamics of the prospective CTBT debate, including the possibility of using treaty safeguards as a bargaining instrument among senators. Finally, this thesis concludes that technical advancements since 1999 in the Stockpile Stewardship Program and the International Monitoring System have bolstered supporting arguments in favor of U.S. ratification of the Comprehensive Test Ban treaty. The decision by the Senate to provide its advice and consent to the CTBT, however, remains difficult to predict due to lingering doubts about the treaty's contribution to non-proliferation efforts, the ability and resolve of the United Nations to enforce compliance with its provisions, and the long-term effects it might have on the credibility of the U.S. nuclear deterrence posture.

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II. PROPONENTS OF THE CTBT

A. OPENING ARGUMENTS

Senator Joseph Biden provided opening remarks for proponents of the Comprehensive Test Ban Treaty during the Senate Foreign Relations Committee hearings in October 1999. He drew parallels to the debate, that took place in the Senate prior to the ratification of the Limited Test Ban Treaty in 1963, citing similar concerns about the ability to maintain a strong U.S. nuclear deterrent, the difficulties in verifying compliance with the treaty, the possibility of another state gaining an unfair advantage by “cheating,” and the question of the effects of the U.S. decision on worldwide nuclear proliferation.²¹

The story since 1963 is one in which those whom I would call the “realistic optimists” were proved right and the “visceral pessimists” did not see their fears realized. Our deterrent posture did not suffer, even though we gave up tests that surely gave us more confidence in our weapons than we could gain through underground tests alone. We gained worldwide respect for reining in the nuclear arms race, which five years later translated into U.S. diplomatic success in negotiating the Nuclear Non-Proliferation Treaty and the treaty banning nuclear weapons in Latin America—treaties that have succeeded in constraining nuclear proliferation.²²

The opening statement by Senator Biden underscored the opinion held by many proponents that ratification of the CTBT by the United States would strengthen worldwide nuclear non-proliferation efforts.

Members of the Clinton administration provided testimony along with several prominent scientists in support of the Comprehensive Test Ban Treaty. Their testimonies centered on the following three arguments:

²¹ Senator Joseph R. Biden, *Prepared Testimony of Joseph R. Biden before the Committee on Foreign Relations, United States Senate*, 7 October 1999 (Washington: Federal News Service, 1999).

²² *Ibid.*

1. U.S. ratification of the CTBT would strengthen the nuclear non-proliferation regime.
2. The U.S. nuclear deterrent could remain safe and reliable under the CTBT.
3. The CTBT would be effectively verifiable.

This chapter describes these three arguments in detail.

B. NON-PROLIFERATION OF NUCLEAR WEAPONS

The unilateral moratorium on U.S. nuclear testing had been in effect for over seven years in 1999, and the Clinton administration had no plans to conduct any future tests. Therefore, the United States had already subjected itself to the major drawbacks of the treaty without obtaining any benefits the treaty might provide. Secretary of State Madeleine Albright asked, “What exactly would we be risking? With no treaty, other countries can test without cheating, and without limit.”²³ Secretary Albright also maintained that the CTBT would have a positive effect on non-proliferation efforts.

The Treaty removes a key tool that a modernizer or a proliferator would need to develop with confidence small, advanced nuclear warheads. These are the weapons that can most readily be concealed; and that can be delivered by ballistic missiles. They are the most threatening to others and to us.... It is potential proliferators who need to test; we do not. By approving the CTBT, we can go far to lock in a technological status quo that protects us without threatening others.²⁴

Secretary Albright's statement indicated that proponents of the CTBT viewed the treaty as a way to put a cap on advanced nuclear weapons technologies. This would have permanently kept the United States as the most advanced nuclear state, assuming that others could not conduct clandestine nuclear tests.

²³ U.S. Department of State, *Testimony of Madeleine K. Albright, Secretary of State, before the Committee on Foreign Relations, United States Senate*, 7 October 1999 (Washington: Federal News Service, 1999).

²⁴ Ibid.

Secretary of Defense William Cohen and the Chairman of the Joint Chiefs of Staff, General Henry Shelton, agreed with the Secretary of State that the treaty would serve the national security interests of the United States by combating the spread of nuclear weapons. In his prepared testimony, Secretary Cohen made the following statement:

I must note that [the] CTBT would promote U.S. non-proliferation efforts. Strengthening international norms against the spread of nuclear weapons, to the extent they can help prevent new nuclear weapons states from emerging, is critically important to our national security.... The CTBT thus is an important element of a mutually reinforcing set of tools to prevent and counter proliferation, which also includes the NPT, MTCR [Missile Technology Control Regime], the Cooperative Threat Reduction Program, targeted and effective export controls, and diplomatic efforts and military programs to counter and defend against WMD [Weapons of Mass Destruction] and their means of delivery.²⁵

Secretary Cohen and General Shelton each supported Senator Biden's argument that the CTBT would add an important element to other successful measures in the nuclear non-proliferation regime.

Advocates of U.S. ratification of the Comprehensive Test Ban Treaty argued that the treaty's entry into force would have several long-term and immediate positive effects on international security. They pointed out that U.S. political credibility was at stake because the United States had agreed to stop testing as part of the 1995 negotiations that indefinitely extended the Treaty on the Non-Proliferation of Nuclear Weapons.²⁶

Key U.S. representatives in the negotiations that produced the Comprehensive Test Ban Treaty agreed that other states viewed U.S. participation in the treaty as crucial to larger non-proliferation efforts. Many believed that rejection of the CTBT by the United States Senate would send a negative message to both friends and foes of the United States. Other states would continue to use the United States as an excuse for their

²⁵ U.S. Department of Defense, *Testimony of William S. Cohen, Secretary of Defense and General Henry H. Shelton, Chairman of the Joint Chiefs of Staff, United States Department of Defense, before the Committee on Armed Services, United States Senate*, 6 October 1999 (Washington: Federal News Service, 1999).

²⁶ Jonathan Medalia, *Comprehensive Test Ban Treaty: Pro and Con*, Congressional Research Service Report for Congress, RS20351 (Washington: Congressional Research Service, 28 June 2005), 2.

own reluctance to sign and ratify the Comprehensive Test Ban Treaty.²⁷ Ambassador Stephen Ledogar, the chief U.S. negotiator of the CTBT from 1993 to 1996, expressed the following concern if the Senate rejected the treaty:

I believe it is not an exaggeration to say that there will be jubilation among our foes and despair among our friends. Iran, Iraq, North Korea and other states that harbor nuclear aspirations surely will feel the constraints loosening. Our allies and friends will feel deserted and betrayed. The global nuclear non-proliferation regime will be endangered.²⁸

Ambassador Ledogar's statement indicated that, without U.S. ratification of the CTBT, other previously successful non-proliferation measures might fail.

Proponents of the CTBT pointed to past successes in international arms control as a reason for prompt U.S. ratification. They contended that other states would follow the lead of the United States if it were to ratify the treaty and offered the Chemical Weapons Convention as a successful example. Secretary Albright said, "Once we decided to move ahead, five countries, including China, chose to submit their ratifications on the same day we did. Cuba ratified a week later, and Iran, Pakistan and Russia followed within eight months."²⁹

Secretary Cohen testified, "The United States does not depend upon nuclear weapons to the same degree as it did during the Cold War."³⁰ He added another dimension to the non-proliferation argument by pointing out the unequalled conventional capabilities of the U.S. military:

²⁷ Hansen, *The Comprehensive Nuclear Test Ban Treaty: An Insider's Perspective*, 72.

²⁸ Ambassador Stephen J. Ledogar, *Testimony of Stephen J. Ledogar, Ambassador to the Conference on Disarmament, before the Committee on Foreign Relations, United States Senate*, 7 October 1999 (Washington: Federal News Service, 1999).

²⁹ U.S. Department of State, *Testimony of Madeleine K. Albright*, 7 October 1999.

³⁰ U.S. Department of Defense, *Testimony of William S. Cohen*, 7 October 1999.

At the same time that nuclear competition with another superpower subsided, the threat has grown of rogue and other countries seeking weapons of mass destruction (WMD), including nuclear weapons, a means to offset our overwhelming conventional superiority or because of regional rivalries.³¹

Although he did not make this point explicitly, Secretary Cohen's comment could have implied that international treaties to limit nuclear capabilities could give the United States an increased advantage over other nuclear weapon states because of its conventional superiority.

C. CREDIBILITY OF U.S. NUCLEAR DETERRENCE

Others argued that the CTBT would also preserve the U.S. advantage in nuclear weapons technology by limiting the test options of others. The United States had conducted 1,032 of the total 2,052 nuclear tests conducted worldwide and had gained the most experience from testing.³² Representatives of the Department of Energy, including Secretary Bill Richardson, testified that the Stockpile Stewardship Program could ensure the long-term safety and reliability of the nuclear stockpile and that the United States would gain little from renewed nuclear testing.³³ Sidney Drell, a founding member of the JASON Defense Advisory Group, provided the following testimony to the Senate.

The detailed analyses that I have been involved in, or led, with expert colleagues, including several of our leading weapons designers, lead me to conclude quite strongly that underground nuclear explosions have little to contribute and nothing essential, relative to what we are presently learning from the stewardship program.³⁴

Drell and Secretary Richardson viewed the Stockpile Stewardship Program as an effective replacement for underground nuclear testing.

³¹ U.S. Department of Defense, *Testimony of William S. Cohen*, 7 October 1999.

³² Preparatory Commission for the Comprehensive Test Ban Treaty, "Nuclear Testing 1945-2009," Comprehensive Test Ban Treaty Organization, available at <http://www.ctbto.org> (accessed 9 July 2009).

³³ U.S. Department of Energy, *Testimony of Bill Richardson, Secretary of Energy, before the Committee on Foreign Relations, United States Senate*, 7 October 1999 (Washington: Federal News Service, 1999).

³⁴ Sidney D. Drell, *Testimony of Sidney D. Drell before the Committee on Foreign Relations, United States Senate*, 7 October 1999 (Washington: Federal News Service, 1999).

Richard Garwin, a Senior Fellow from the Council on Foreign Relations and a member of the JASON group, stated that the Stockpile Stewardship Program could remedy all deficiencies in the U.S. nuclear stockpile without tests involving critical nuclear explosions.³⁵ He conceded that primary and secondary explosives would eventually age and require remanufacture, but argued that the CTBT would have no effect on their reliability.

[I]f they are remanufactured to the same specifications as they were initially produced, they will be as good as the day they were first made. This can be done any number of times, and is the basis for my confidence in the future stockpile.... We need to have not only the assessment but the remanufacturing facility; the need for that facility has nothing to do with the CTBT.³⁶

In Garwin's estimation, U.S. ratification of the CTBT would not have any detrimental effects on the U.S. nuclear stockpile. He insisted that the nuclear industrial complex must be maintained regardless of the status of the CTBT.

D. VERIFICATION

Other states could substantially benefit from renewed testing, so verification of compliance with the Comprehensive Test Ban Treaty was a central issue in the debate. Proponents of the treaty admitted that states conducting nuclear tests could conceivably evade detection by the International Monitoring System and National Technical Means, but declared that such tests would be difficult to accomplish and would provide minimal benefits. Secretary of Defense Cohen made the following statement in regard to verification:

CTBT evasion is not easy, it would require significant efforts in terms of expertise, preparations, and resources. In the end, the testing party has no guarantees that its preparations or its nuclear test will escape detection, and possible on-site inspection, despite its best efforts. In addition, detection capability varies according to the location of the clandestine test and the evasion measures employed; a potential evader may not

³⁵ Richard L. Garwin, *Testimony of Richard L. Garwin before the Committee on Foreign Relations, United States Senate*, 7 October 1999 (Washington: Federal News Service, 1999).

³⁶ *Ibid.*

understand the full U.S. monitoring capability, thus adding to his uncertainty. Further, detection of a nuclear explosion conducted in violation of the CTBT would be a very serious matter with significant political consequences.³⁷

Secretary Cohen acknowledged that clandestine nuclear testing could take place under the CTBT, but expressed the judgment that states would not have an adequate incentive to do so. It would be difficult for others to calculate the risk of being caught; there would be significant political consequences if cheating was detected, and clandestine tests would probably not produce sizable gains in nuclear weapons technology.

E. SUMMARY

Proponents of the Comprehensive Test Ban Treaty presented three main arguments, while seeking the advice and consent of the U.S. Senate. They argued that the treaty was an opportunity for the United States to show its leadership and good faith in meeting its NPT Article VI commitment to work toward nuclear disarmament while bolstering worldwide efforts to curb the threat of nuclear proliferation. At the same time, they testified to the adequacy of the Stockpile Stewardship Program to protect the nuclear deterrence posture of the United States and to the adequacy of verification measures to ensure treaty compliance by others. In the end, their efforts failed and the CTBT fell far short of the required two-thirds majority vote in the United States Senate.

³⁵ U.S. Department of Defense, *Testimony of William S. Cohen*, 6 October 1999.

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III. OPPONENTS OF THE CTBT

A. OPENING ARGUMENTS

Opponents of U.S. ratification of the Comprehensive Test Ban Treaty disagreed with its proponents on what issues were relevant to the decision and on the interpretation of the information presented during the Senate hearings in 1999. Not surprisingly, opponents of the treaty addressed all of the same issues presented by their counterparts, but took an entirely different stance on each of them. Their main arguments included the following three elements:

1. U.S. ratification of the CTBT would undermine the nuclear non-proliferation regime.
2. The U.S. nuclear deterrent could not remain safe and reliable under the CTBT.
3. The CTBT would not be effectively verifiable and enforceable.

Skeptics regarding the Comprehensive Test Ban Treaty saw little to no value in ratifying it. In their view, the primary health and environmental benefits of limitations on nuclear testing had been achieved by the 1963 Limited Test Ban Treaty, which banned tests everywhere but underground.³⁸ They also disputed the effectiveness of the International Monitoring System's ability to detect clandestine tests as well as the resolve of the United Nations Security Council to punish those that conduct nuclear tests. Opponents of the CTBT used the Biological and Toxin Weapons Convention and the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) as examples of failed international treaties. Kathleen Bailey, the first social scientist hired by Lawrence Livermore National Laboratory, articulated this view during her testimony to the Senate:

Over the history of the NPT norm, the list of states which broke or are thought to have broken the norm include Argentina, Brazil, India, Iran, Iraq, Israel, North Korea, Pakistan, South Africa, South Korea, and Taiwan. North Korea is still in violation of the treaty and its norm, with

³⁸ Ronald F. Lehman, *Testimony of Ronald F. Lehman before the Committee on Foreign Relations, United States Senate*, 7 October 1999 (Washington: Federal News Service, 1999).

no adverse consequences for its noncompliance. It is also worth noting that the NPT is signed by virtually every country except Pakistan, India, and Israel. The CTBT, therefore, would be a treaty in which nations promise not to test the weapons that they have already promised not to develop. It is redundant.... Nations seek weapons based on their own security needs.... A nation whose leadership believes nuclear weapons are needed for security is not going to abandon the idea simply because the U.S. conducts or does not conduct nuclear tests.³⁹

Bailey's statement simultaneously disputed the success of the Treaty on the Non-Proliferation of Nuclear Weapons and questioned the relevance of the Comprehensive Test Ban Treaty.

B. PROLIFERATION OF NUCLEAR WEAPONS

Kathleen Bailey summed up the position of many opposed to the ratification of the Comprehensive Test Ban Treaty. While the treaty's effects on nuclear non-proliferation efforts were central to the arguments presented by its proponents, many remained skeptical about its value. They questioned the effectiveness of this treaty and other treaties, such as the Treaty on the Non-Proliferation of Nuclear Weapons, in containing the development and proliferation of nuclear weapons. In fact, some argued that the CTBT would actually undermine non-proliferation efforts and give states more incentive to develop their own nuclear deterrents. A loss of confidence in either the credibility of the U.S. nuclear stockpile or the resolve of the U.S. government to guarantee nuclear retaliation on behalf of its allies in response to any attacks using weapons of mass destruction, they argued, would increase domestic pressures within those states to procure their own nuclear deterrents. James Schlesinger, a former Director of the Central Intelligence Agency, Secretary of Defense and Secretary of Energy, testified:

This will particularly be the case, when and if confidence in the reliability and robustness of the U.S. deterrent wanes. Some nations will rely less on the protections for non-nuclear weapon states implicit in the Non-Proliferation Treaty and [will be] more inclined to depend on their own

³⁹ Kathleen C. Bailey, *Testimony of Kathleen C. Bailey before the Committee on Armed Services, United States Senate*, 7 October 1999 (Washington: Federal News Service, 1999).

resources. To the extent that confidence in and thus credibility of the U.S. deterrent wanes, ironically and perhaps paradoxically, the CTBT could in the long run result in greater rather than less proliferation.⁴⁰

Schlesinger's statement articulated the position of many opposed to U.S. ratification of the Comprehensive Test Ban Treaty. In their assessments, the CTBT would inevitably weaken U.S. nuclear deterrence. This would, in turn, encourage nuclear proliferation because allies would no longer count on U.S. nuclear weapons to provide deterrence in their defense, and their adversaries would no longer fear U.S. nuclear retaliation.

C. CREDIBILITY OF U.S. NUCLEAR DETERRENCE

While the issue of non-proliferation was central to the arguments of the treaty's proponents, the credibility of U.S. nuclear deterrence was the focal point for those skeptical of the CTBT. Some testified that a lack of nuclear testing in the United States would undermine the credibility of the U.S. nuclear deterrent and that testing programs should be preserved. They did not believe that the Stockpile Stewardship Program was a proven substitute for nuclear testing, nor could it ensure the long-term safety and reliability of the U.S. stockpile.

The United States Department of Energy began development of the Stockpile Stewardship Program shortly after the moratorium on nuclear testing began and implemented its measures as a safeguard to the Comprehensive Test Ban Treaty under the Clinton administration in 1996.⁴¹ The program was, therefore, only three years old when the debate took place in the United States Senate and many felt that its merits should have been proven before the cessation of nuclear testing. Robert B. Barker, the Assistant to the Secretary of Defense for Atomic Energy in the George H.W. Bush administration and a former Associate Director for Arms Control at the Lawrence Livermore National Laboratory, provided the following testimony:

⁴⁰ James R. Schlesinger, *Testimony of James R. Schlesinger before the Committee on Armed Services, United States Senate*, 6 October 1999 (Washington: Federal News Service, 1999).

⁴¹ Gene Aloise, *Nuclear Weapons: NNSA and DoD need to more effectively manage the stockpile life extension program*, Report to the Subcommittee on Strategic Forces, Committee on Armed Services, House of Representatives, Natural Resources and Environment, Government Accountability Office Report 09-385 (Washington: Government Accountability Office, 2009), 1.

The Stockpile Stewardship program is not now and never will be—even ten years from now when its major components might be operational—a substitute for nuclear testing in the sense of giving us equal confidence in the safety and reliability of our nuclear weapons. The U.S. abandoned the prudent approach when it ceased nuclear testing in 1992 without demonstrating a reliable substitute for nuclear tests.⁴²

John S. Foster, a former weapons designer and director of Lawrence Livermore National Laboratory, also cited historical evidence of how an international agreement to limit nuclear testing led to a simultaneous decrease in reliability and a false sense of confidence in the 1950s.

Many of you recall the 1958 Gentleman's Understanding on a moratorium on nuclear testing and the abrupt Soviet breaking of that understanding. President Kennedy, referring to the agreement said, "Once fooled, shame on them; twice fooled, shame on us." During the three years of that moratorium we made great progress with our computer calculations and hydrodynamic experiments. When the Soviets broke the moratorium and we also went back to testing, we found out how badly we had fooled ourselves.⁴³

The statements made by Barker and Foster indicated that several nuclear weapons experts were not convinced that the Stockpile Stewardship Program could ensure the long-term safety and reliability of U.S. nuclear weapons.

Another reason the CTBT would undermine the credibility of U.S. nuclear deterrence, its opponents argued, was that a lack of testing would have more adverse consequences on the U.S. stockpile than on the nuclear weapons of any other state. They noted that the design complexities of U.S. nuclear warheads left little margin for error, and that they were never designed to last as long as they had been maintained in the stockpile.⁴⁴ Normal radioactive decay and chemical decomposition could have unanticipated damaging effects on the safety and reliability of U.S. nuclear warheads. Meanwhile, other states had significantly different standards for reliability and less

⁴² Robert B. Barker, *Testimony of Robert B. Barker before the Committee on Armed Services, United States Senate*, 7 October 1999 (Washington: Federal News Service, 1999).

⁴³ John S. Foster, Junior, *Testimony of John S. Foster, Jr. before the Committee on Armed Services, United States Senate*, 7 October 1999 (Washington: Federal News Service, 1999).

⁴⁴ Schlesinger, *Testimony*, 6 October 1999.

sensitivity to margins and uncertainties.⁴⁵ Robert Barker stated, “We should not assume that others will have the same need for testing that we have. Other nations’ nuclear weapons will not decay at the same rate; every nation will not lose confidence in their nuclear weaponry at the same time.”⁴⁶ Barker implied that the United States might lose confidence in its nuclear weapons after not testing them for some period of time, while other states might retain full confidence in their nuclear weapons. This would result in a huge shift in the international balance of power if the United States lost its nuclear deterrent credibility prior to other nuclear-armed states.

D. VERIFICATION

Skeptics about the CTBT argued that the treaty was not verifiable and that, while the United States would faithfully comply with the treaty, other states would “cheat.”⁴⁷ They noted that previous treaties, such as the Limited Test Ban Treaty and the Threshold Test Ban Treaty, were both ratified because each could be verified.⁴⁸ According to all three U.S. weapons laboratories, testing at 500 tons of nuclear yield provides useful data, but testing between one and ten kilotons is required to become fully confident in the safety and reliability of any new designs.⁴⁹ Kathleen Bailey provided the following testimony regarding evasive testing:

A nation may conduct nuclear tests evasively, which would allow several kilotons to be tested with little or no risk of detection. One method by which this might be done is through energy decoupling—detonation of the device in a cavity—that can reduce the signal by as much as a factor of 70. Thus, a kiloton explosion could be made to look seismically like a 14-ton explosion fully coupled. A 10-kiloton explosion could look like a .14-kiloton explosion. It is clear that the IMS [International Monitoring

⁴⁵ Bailey, *Testimony*, 7 October 1999.

⁴⁶ Barker, *Testimony*, 7 October 1999.

⁴⁷ Bailey, *Testimony*, 7 October 1999.

⁴⁸ Troy E. Wade, *Testimony of Troy E. Wade before the Committee on Foreign Relations, United States Senate*, 7 October 1999 (Washington: Federal News Service, 1999).

⁴⁹ Bailey, *Testimony*, 7 October 1999.

System] will not be able to detect nuclear testing below one kiloton and, if the test is evasively conducted, will not detect several kilotons. Supplemental data from U.S. national technical means will not fill the gap.⁵⁰

Bailey's statement demonstrated that many doubted the International Monitoring System's ability to detect clandestine nuclear testing by those determined to advance their command of nuclear weapons technology. Energy decoupling provided a plausible method to evade detection and, therefore, the political consequences of illegal nuclear testing.

E. SUMMARY

Opponents of the Comprehensive Test Ban Treaty argued that the treaty was unverifiable and would undermine the credibility of the U.S. nuclear deterrent, which could then lead to more nuclear proliferation and international instability. Their arguments in 1999 were sufficient for the majority of U.S. senators to vote against providing their advice and consent to the CTBT. (The vote was 48 to 51.)

Many of the arguments presented during the 1999 U.S. Senate hearings have endured. Most who continue to oppose ratification of the CTBT do so because they believe that it will weaken U.S. nuclear deterrence and lead to international instability, including possible proliferation of nuclear weapons. They have little confidence in the Stockpile Stewardship Program, the International Monitoring System, and the United Nations Security Council's willingness to enforce treaty compliance. They also doubt that the CTBT would make any valuable contribution to the nuclear non-proliferation regime.

⁵⁰ Bailey, *Testimony*, 7 October 1999.

IV. DEVELOPMENTS SINCE 1999

A. AFTERMATH OF THE SENATE REJECTION

The Clinton administration quickly established a commission to address the concerns that had led to the U.S. Senate's rejection of the Comprehensive Test Ban Treaty. Retired General and former Chairman of the Joint Chiefs of Staff John Shalikashvili led the commission and released a report in January 2001. This report provided recommendations to achieve bipartisan support for the CTBT by addressing concerns over whether the CTBT had genuine non-proliferation value, whether cheating could threaten U.S. security, whether the U.S. nuclear deterrent could remain safe and reliable without nuclear testing, and whether it was wise to endorse a treaty of indefinite duration.⁵¹

Several of General Shalikashvili's recommendations were adopted by the George W. Bush administration despite its continued opposition to the CTBT. President Bush continued the moratorium on nuclear testing and the United States continued to contribute money to the construction and establishment of the International Monitoring System. Increased funding was also given to the Stockpile Stewardship Program. The Nuclear Weapons Council provides annual reports on the safety and reliability of the U.S. nuclear stockpile to the Secretary of Defense and the Secretary of Energy, who are now required by law to submit their annual stockpile assessments to the President and Congress.⁵²

⁵¹ John M. Shalikashvili, *Letter to the President and Report on the Findings and Recommendations Concerning the Comprehensive Nuclear Test Ban Treaty*, (Washington: U.S. State Department, 4 January 2001), I.

⁵² Gene Aloise, *Nuclear Weapons: Annual Assessment of the Safety, Performance, and Reliability of the Nation's Stockpile*, Government Accounting Office Report 07-243R to the Subcommittee on Strategic Forces, Committee on Armed Services, House of Representatives, Natural Resources and Environment (Washington: Government Accounting Office, 2007), 2.

The Bush administration did not appoint a Deputy National Security Advisor for Non-Proliferation, as called for in the Shalikashvili report.⁵³ National Security Presidential Directive 17 (NSPD-17), however, called for the strengthening of multilateral regimes, including the Treaty on the Non-proliferation of Nuclear Weapons and the International Atomic Energy Agency (IAEA).⁵⁴ This document made no reference to the Comprehensive Test Ban Treaty as any part of the administration's non-proliferation strategy.

B. GEOPOLITICAL DEVELOPMENTS

1. China and Russia

China and Russia have continued to modernize their nuclear weapons systems since 1999. China is believed to be the only one of the five NPT-recognized nuclear weapons states to have increased the size of its nuclear arsenal since the end of the Cold War. China is now estimated to have approximately 400 nuclear weapons in its possession.⁵⁵ According to Christopher Ford, a former Principal Deputy Assistant Secretary of State and Special Representative for Nuclear Nonproliferation during the George W. Bush administration:

China is today the sole country among the five NPT nuclear weapons states to be actually increasing the size of its nuclear arsenal. It is also one of four NPT nuclear weapons states that is modernizing its strategic nuclear delivery systems. This build-up is usually described as "slow," but according to Pentagon estimates China has actually increased the size of its arsenal by about 25 percent since 2005 alone. Beijing's qualitative and quantitative improvements include new road-mobile intercontinental ballistic missiles and a new submarine that will fire equally new missiles.⁵⁶

⁵³ Shalikashvili, *Letter to the President*, 7.

⁵⁴ George W. Bush, "National Strategy to Combat Weapons of Mass Destruction," National Security Presidential Directive number 17 (Washington: The White House, December 2002), 3–4.

⁵⁵ *America's Strategic Posture*, 111.

⁵⁶ Christopher A. Ford, "Nonproliferation and Disarmament Attitudes and Perspectives: Troubling Divergences," Remarks at the IGCC Public Policy and Nuclear Threats 2009 Summer Training Workshop, 29 July 2009 (San Diego: University of California, 2009): 5.

Modernization programs in China and Russia lend credibility to the arguments made by skeptics regarding the CTBT in 1999. China has qualitatively and quantitatively improved its nuclear forces despite its nuclear test moratorium, while the U.S. nuclear stockpile has continued to decline.

Russia has also modernized some of its nuclear forces, while continuing to reduce the overall numbers of deployed nuclear weapons in accordance with bilateral agreements with the United States. Since 1999, Russia has worked on developing the Sineva and Bulava submarine-launched ballistic missiles and a mobile-launched variant of the Topol-M intercontinental ballistic missile.⁵⁷ Officially, the last Russian nuclear weapons test occurred on 24 October 1990 and the Russian Federation ratified the CTBT on 30 June 2000.⁵⁸ Some contend that the Russians, however, and possibly the Chinese have concealed low-yield nuclear tests as part of their modernization programs, contrary to their own test moratoriums and the CTBT signed by both states in 1996.⁵⁹ According to the 2009 Final Report of the Congressional Commission on the Strategic Posture of the United States, "Apparently, Russia and possibly China are conducting low-yield tests. This is quite serious because Russian and Chinese doctrine highlights tactical nuclear warfighting."

Christopher Ford found this allegation surprising only in that the commission publicly acknowledged Russian low-yield nuclear testing, instead of keeping it classified. He postulated, "If this is true, and if such activity has been known or suspected for some time, then the 1999 Senate rejection of the CTBT might also have reflected concerns about the prospect of Russian CTBT violations undetected by the treaty's monitoring system."⁶⁰ Ford also made the following observations during a 2009 speech:

⁵⁷ Robert S. Norris and Hans M. Kristensen, "Nuclear Notebook: Russian nuclear forces, 2009," *Bulletin of the Atomic Scientists*, May/June 2009, Volume 65, Number 3: 57.

⁵⁸ Comprehensive Test Ban Treaty Organization Web site, "Status of signature and ratification."

⁵⁹ *America's Strategic Posture*, 83.

⁶⁰ Christopher A. Ford, "Test Ban Treaty, Take Two," *The New Atlantis*, Summer 2009 (Washington: The Ethics and Public Policy Center, 2009): 113–114.

Russia seems to have become increasingly *committed* to nuclear weaponry.... Russia has, in the words of its own officials, "lower[ed] the threshold for using nuclear weapons" and "extend[ed] the nuclear deterrent to smaller conflicts." Russia is also modernizing its strategic delivery systems, deploying new mobile missiles, working on a new generation of ballistic missile submarine with a new missile and warhead, and developing an entirely new "hypersonic glide vehicle" launched from a ballistic missile. Nor has modernization work stopped with delivery systems: Moscow is developing new types of nuclear weapons, apparently in part by using secret low yield nuclear explosive tests notwithstanding Russia's claimed testing moratorium.⁶¹

Russia rejects allegations that it has engaged in low-yield testing, however, and claims that it develops its new delivery systems and maintains its warheads without nuclear testing. In July 2009, Russian President Dmitry Medvedev said, "Under the global ban on nuclear tests, we can only use computer-assisted simulations to ensure the reliability of Russia's nuclear deterrent."⁶² The alleged low-yield nuclear testing by Russia is important for two reasons. First, clandestine testing would invalidate the claims that the International Monitoring System would be effective and thus call into question the verifiability of the CTBT. Second, if Russia has indeed conducted low-yield nuclear testing in violation of its own moratorium, it would prove that other states could violate the CTBT and improve their nuclear weapons without political repercussions.

2. India and Pakistan

Neither India nor Pakistan has conducted any known nuclear weapons testing since 1998, but each maintains a modest nuclear arsenal. Indian leaders have remained unapologetic about their refusal to sign the NPT or the CTBT. India's External Affairs Minister, Pranab Mukherjee, recently said, "We will not sign the CTBT."⁶³ India did, however, sign the U.S.-India Civilian Nuclear Cooperation Initiative in 2005. This

⁶¹ Ford, "Nonproliferation and Disarmament Attitudes and Perspectives," 3–4; emphasis in the original.

⁶² Dmitry Medvedev, "Russia to test its nuclear deterrent with supercomputers," RIA Novosti, 22 July 2009, available at <http://en.rian.ru/russia/20090722/155586451.html> (accessed 23 October 2009).

⁶³ Deepti Choubey, "Don't wait for the United States," *CTBTO Spectrum*, Issue 12, April 2009 (Vienna: Preparatory Commission for the Comprehensive Test Ban Treaty, 2009): 10.

agreement separates India's civilian power industry from its military nuclear programs and subjects the former to safeguard protocols under the IAEA. According to a joint U.S.-Indian statement,

These responsibilities and practices consist of: identifying and separating civilian and military nuclear facilities and programs in a phased manner, and filing a declaration regarding its civilian facilities with the International Atomic Energy Agency (IAEA); taking a decision to place voluntarily its civilian nuclear facilities under IAEA safeguards; signing and adhering to an Additional Protocol with respect to civilian nuclear facilities; continuing India's unilateral moratorium on nuclear testing; working with the United States for the conclusion of a multilateral Fissile Material Cut Off Treaty; refraining from transfer of enrichment and reprocessing technologies to states that do not have them and supporting international efforts to limit their spread; and ensuring that the necessary steps have been taken to secure nuclear materials and technology through comprehensive export control legislation and through harmonization and adherence to Missile Technology Control Regime (MTCR) and Nuclear Suppliers Group (NSG) guidelines.⁶⁴

India has proven that it is willing to work with international institutions, including the International Atomic Energy Agency, but it has shown no interest in signing the Treaty on the Non-Proliferation of Nuclear Weapons or the Comprehensive Test Ban Treaty.

Pakistan often links its nuclear weapons program to that of India and maintains that its estimated 60 nuclear warheads are necessary for deterrence against attacks by WMD and/or a much larger Indian conventional military.⁶⁵ A border skirmish between India and Pakistan, known as the Kargil Conflict, killed hundreds of soldiers from each side between May and July of 1999 and fueled fears of a potential nuclear war between the two states.⁶⁶ The resulting peace agreement between the two states was controversial in Pakistan and led to a military coup, which ousted Pakistan's democratically elected government on 12 October 1999, just one day prior to the CTBT vote in the U.S.

⁶⁴ "Joint Statement Between President George W. Bush and Prime Minister Manmohan Singh," *The White House Archives*, 18 July 2005, available at <http://georgewbush-whitehouse.archives.gov/news/releases/2005/07/20050718-6.html> (accessed October 25, 2009).

⁶⁵ *America's Strategic Posture*, 111.

⁶⁶ K. Alan Kronstadt, *Nuclear Weapons and Ballistic Missile Proliferation in India and Pakistan: Issues for Congress*, Congressional Research Service Report for Congress, RL30623 (Washington: Congressional Research Service, 31 July 2000), 4.

Senate.⁶⁷ Some analysts have viewed Pakistan's nuclear stockpile as a potential source of nuclear weapons for terrorists because of the continuing political and social turmoil and the violent extremist organizations that operate within its borders. Perhaps the most significant nuclear proliferation-related development involving Pakistan since 1999 was the public revelation in 2004 that Pakistani nuclear entrepreneur Abdul Qadeer Khan and his associates had exported nuclear weapons-related technologies to Iran, Libya, North Korea and perhaps others.⁶⁸

3. Iran

The International Atomic Energy Agency (IAEA) also investigated Iran in 2003 for having concealed nuclear-related activities. Undeclared nuclear facilities at Natanz and Arak were found to be conducting illicit nuclear activities, including the importation of uranium compounds, plutonium separation experiments, and uranium enrichment and conversion experiments, all of which violated Iran's safeguards agreement with the IAEA.⁶⁹ Iran temporarily suspended most of these activities, but resumed uranium enrichment and conversion in 2005. Discussions between Iran and various international organizations, including the IAEA and the United Nations, have yielded mixed results, but the latest report from the IAEA indicates that Iran has continued to defy the United Nations Security Council's demands by continuing its uranium enrichment and heavy-water reactor programs.⁷⁰ In addition to these violations, President Barack Obama revealed an additional clandestine nuclear facility near Qom, Iran, on 25 September 2009:

⁶⁷ Kronstadt, *Nuclear Weapons and Ballistic Missile Proliferation in India and Pakistan: Issues for Congress*, 5.

⁶⁸ David Albright and Corey Hinderstein, "Unraveling the A. Q. Khan and Future Proliferation Networks," *The Washington Quarterly*, Spring 2005 (Washington: Center for Strategic and International Studies and the Massachusetts Institute of Technology, 2005): 111.

⁶⁹ Paul K. Kerr, *Iran's Nuclear Program: Status*, Congressional Research Service Report for Congress, RL34544 (Washington: Congressional Research Service, 18 September 2009), 4.

⁷⁰ *Implementation of the NPT Safeguards Agreement and Relevant Provisions of Security Council Resolutions 1737 (2006), 1747 (2007), 1803 (2008), and 1835 (2008) in the Islamic Republic of Iran*, International Atomic Energy Agency, Report by the Director General, GOV/2009/55, 28 August 2009: 6.

The existence of this facility underscores Iran's continuing unwillingness to meet its obligations under U.N. Security Council resolutions and IAEA requirements. Iran's decision to build yet another nuclear facility without notifying the IAEA represents a direct challenge to the basic compact at the center of the non-proliferation regime.⁷¹

Whether Iran intends to build nuclear weapons is currently subject to debate in the international community. Intelligence agencies and international inspectors are concerned that Iran could have sufficient enriched uranium, a missile (the Shahab 3) capable of reaching Israel and parts of Europe, and a warhead small enough to fit on the Shahab 3.⁷² If Iran did arm itself with nuclear weapons, it would immediately create security dilemmas in Europe and the Middle East; and this could lead to further nuclear proliferation.

4. North Korea

North Korea withdrew from the NPT in 2003 and conducted an underground test of a nuclear weapon on 9 October 2006. The United Nations Security Council responded with Resolution 1718, imposing economic sanctions on North Korea.⁷³ Six party talks involving China, Japan, North Korea, Russia, South Korea, and the United States have been conducted intermittently since 2003 in an attempt to curb North Korea's nuclear weapons aspirations. North Korea boycotted the six party negotiations twice between 2004 and 2007, but eventually signed agreements to disable fissile material production capabilities at its Yongbyon facilities in exchange for economic aid and reduced sanctions.⁷⁴ In April 2009, however, North Korea launched a Taepodong II test missile

⁷¹ Barack Obama, "Statements by President Obama, French President Sarkozy, and British Prime Minister Brown on Iranian Nuclear Facility," *The White House*, 25 September 2009, available at http://whitehouse.gov/the_press_office/ (accessed 26 October 2009).

⁷² "Iran Has Nuclear Weapon Know-How, IAEA Findings Suggest," *Global Security Newswire*, 5 October 2009, available at <http://www.globalsecuritynewswire.org/> (accessed 22 October 2009).

⁷³ Mary Beth Nikitin, et al., *North Korea's Second Nuclear Test: Implications of U.N. Security Council Resolution 1874*, Congressional Research Service Report for Congress, RL40684 (Washington: Congressional Research Service, 23 July 2009), 1.

⁷⁴ Larry A. Niksch, *North Korea's Nuclear Weapons Development and Diplomacy*, Congressional Research Service Report for Congress, RL33590 (Washington: Congressional Research Service, 27 May 2009), 1.

over Japan, terminated its participation in the six party talks, and expelled U.S. and IAEA personnel at Yongbyon.⁷⁵ North Korea announced soon after that it had conducted a second underground test of nuclear weapons on 25 May 2009.⁷⁶

Recent events indicate that North Korea might soon return to the six party negotiations, but the prospects of its nuclear disarmament are uncertain. Some contend that the current leadership in Pyongyang merely uses negotiations as a stalling tactic. Henry Kissinger remarked that,

At the end of a negotiation, North Korea will either destroy its nuclear arsenal, or it will become a de facto nuclear state. So far, it has used the negotiating forums available to it in a skillful campaign of procrastination, alternating leaps in technological progress with negotiating phases to consolidate it. We seem to be approaching such a consolidation phase now. North Korea may return to its well-established tactic of diverting us with the prospect of imminent breakthroughs. This is exactly what happened after the last Korean nuclear weapons test in 2006. Pyongyang undoubtedly will continue to seek to achieve de facto acceptance as a nuclear weapons state by endlessly protracted diplomacy.... Any outcome other than the elimination of the North Korean nuclear military capability in a fixed time period is a blow to non-proliferation prospects worldwide and to peace and stability globally.⁷⁷

If Kissinger is correct in his assessment of North Korea, there is no reason to believe that it will abandon its nuclear weapons program and dismantle its current stockpile to rejoin the NPT. North Korea's withdrawal from the NPT undermined the entire nuclear non-proliferation regime and significantly reduced the probability of the CTBT's entry into force.

5. Interpretations of Geopolitical Developments

These developments in the geopolitical environment since 1999 can be interpreted in different ways, depending on one's perspective. Both sides of the CTBT debate agree

⁷⁵Niksch, *North Korea's Nuclear Weapons Development and Diplomacy*, 1.

⁷⁶ Ibid.

⁷⁷ Henry A. Kissinger, "North Korea's Nuclear Blackmail," *The New York Times*, 9 August 2009.

that nuclear proliferation is a serious threat to U.S. national security, but the two sides disagree on the status of the non-proliferation regime in light of current events.

Opponents of the treaty point to nuclear force modernization programs and possible low-yield testing programs in China and Russia as proof that the CTBT is vague and unverifiable.⁷⁸ Comments by Indian and Pakistani leaders also lead some analysts to believe that the treaty will not enter into force any time soon even if the United States does ratify it. Therefore, by this logic, there would be no point in subjecting the United States to the restrictions of the CTBT while others could ignore them.

To skeptics regarding the CTBT, Iran and North Korea epitomize the reasons why the treaty will be of no benefit to U.S. national security. The New Deterrent Working Group stated that

The accelerating proliferation of nuclear weapons technology in places like Pakistan, North Korea, Iran and Syria is an indictment of the effort to prevent such a danger via arms control. The global non-proliferation regime has been steadily declining for many years, and it has now reached the point of impotence.⁷⁹

Each of these states has successfully concealed significant portions of its nuclear programs, while international treaties and United Nations Security Council actions have not provided effective measures against nuclear proliferation. Mohamed ElBaradei, Director General of the IAEA from 1 December 1997 through 30 November 2009, publicly acknowledged his agency's inability to investigate clandestine nuclear activities in some states:

In over 90 states, the Agency either has no verification authority at all, or its authority is inadequate, because these countries have not concluded the necessary agreements with the Agency. That means we often cannot verify whether a country is engaged in clandestine nuclear activities.⁸⁰

⁷⁸ *America's Strategic Posture*, 83.

⁷⁹ The New Deterrent Working Group, "Towards a New Deterrent," Occasional Papers Series, 26 January 2009 (Washington: Center for Security Policy, 2009).

⁸⁰ Mohamed ElBaradei, "Statement to the Sixty-Fourth Regular Session of the United Nations General Assembly by IAEA Director General Dr. Mohamed ElBaradei," International Atomic Energy Agency News Centre, 2 November 2009 (New York: United Nations General Assembly, 2009).

The IAEA's continued inability to investigate clandestine nuclear activities provides evidence supporting the argument that the CTBT is unverifiable. Weak support for the IAEA from the United Nations Security Council leads many to conclude that states conducting illicit nuclear testing would not receive proper punishment even if the CTBT entered into force.

Proponents of the CTBT, in contrast, hold that the NPT has been successful in curbing nuclear proliferation among all states minus the few noted exceptions. They argue that early entry into force of the CTBT is urgent to freeze the technological capabilities of established nuclear weapon states and to contain proliferation threats such as Iran and North Korea. They are also optimistic that other states will move toward ratification if the United States ratifies the treaty. In fact, Indonesia has already pledged to do so.⁸¹ Deepti Choubey, deputy director of the non-proliferation program at the Carnegie Endowment for International Peace, wrote:

Proliferation threats like Iran make U.S. ratification more urgent and a smart global security strategy. After the U.S. and China ratify, the major powers will have another tool for impeding Iran's nuclear ambitions. Because China's ratification is linked to the timing of U.S. ratification, the United States must act first.... By legally committing itself to the global norm against nuclear tests, Iran could reduce concerns about its nuclear program. Not doing so increases the skepticism from countries that until now have kept an open mind about Iran's "nuclear file." The U.S. would be in a stronger position to make this demand and to translate that skepticism into support for other enforcement measures if it ratifies first and soon.⁸²

Choubey's argument is that U.S. ratification of the CTBT could provide momentum for others to follow. This could further isolate the remaining holdouts and put increased international pressure on them to cooperate with non-proliferation regimes.

⁸¹ Deepti Choubey, "Iran Brings Urgency to U.S.'s Need to Ratify Nuclear-Test Treaty," Carnegie Endowment for International Peace, 20 October 2009 (Washington: Carnegie Endowment for International Peace, 2009).

⁸² Ibid.

C. DEVELOPMENTS IN THE ARGUMENT FOR RATIFICATION

Some nuclear arms control advocates continue to view the CTBT as an important part of the nuclear non-proliferation regime and a significant step toward global nuclear disarmament. Proponents of the CTBT assert that further delays in U.S. ratification could call into question the U.S. commitment to upholding the political agreements associated with the 1995 indefinite extension of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). Many believe that continued support of the non-proliferation regime by some nonnuclear states is dependent on the willingness of nuclear-armed states to work towards disarmament.⁸³ This argument stems from Article VI of the NPT, which states the following:

Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a Treaty on general and complete disarmament under strict and effective international control.⁸⁴

Other advocates of the Comprehensive Test Ban Treaty focus on the technical feasibility of maintaining the U.S. nuclear deterrent under the test ban while monitoring the compliance of other states. George P. Shultz, William J. Perry, Henry A. Kissinger and Sam Nunn have advocated “initiating a bipartisan process with the Senate, including understandings to increase confidence and provide for periodic review, to achieve ratification of the Comprehensive Test Ban Treaty, taking advantage of recent technical advances, and working to secure ratification by other key states.”⁸⁵

Recent technical advances include scientific studies on the effects of U.S. nuclear warhead aging and on the ability to detect warhead defects, as well as improvements in the ability to detect clandestine nuclear tests performed by other states. The 2006 JASON report concluded that the primary-stage fissile materials in the core explosive elements (also known as “pits”) are reliable in most stockpile weapons for more than 100

⁸³ Daryl Kimball, "Achieving Entry Into Force of the CTBT," *Global Security Institute*, January 26, 2005, http://www.gsinitiative.org/mpi/pubs/atlanta_kimball.pdf (accessed 15 July 2009).

⁸⁴ *Treaty on the Non-Proliferation of Nuclear Weapons, Article VI* (New York: United Nations General Assembly, 12 June 1967).

⁸⁵ Shultz, et al.: "A World Free of Nuclear Weapons," A15.

years, a period much longer than originally postulated.⁸⁶ A 2002 National Academy of Sciences study also determined that a properly resourced Stockpile Stewardship Program could ensure the long-term safety and reliability of the U.S. nuclear stockpile within the constraints of the Comprehensive Test Ban Treaty.

It seems to us that the argument to the contrary—that is, the argument that improvements in the capabilities that underpin confidence in the absence of nuclear testing will inevitably lose the race with the growing needs from an aging stockpile—underestimates the current capabilities for stockpile stewardship, underestimates the effects of current and likely future rates of progress in improving these capabilities, and overestimates the role that nuclear testing ever played (or would ever be likely to play) in ensuring stockpile reliability.⁸⁷

Richard Garwin testified before Congress in 2009 that he expects a properly resourced stockpile stewardship program to actually increase confidence in the reliability of existing nuclear warheads.

I believe that the existing weapons can remain closer to their test pedigree than a replacement weapon will be to any specific nuclear test, and that responsible choice of modifications to the existing weapons would result in *increased* confidence in the performance with time, rather than the *erosion* of confidence.⁸⁸

The 2002 report from the National Academy of Sciences and the 2006 JASON report provided reassurance regarding the safety and reliability of the U.S. nuclear stockpile and indicated that some concerns may have been overstated during the 1999 Senate hearings. The scientists involved in these studies, including Richard Garwin, believe that the Stockpile Stewardship Program has demonstrated its capacity to maintain, if not improve, the safety and reliability of U.S. nuclear weapons without nuclear testing.

⁸⁶ R.J. Hemley, et al., *Pit Lifetime*, JASON report JSR-06-335 (McLean, VA: MITRE Corporation, 20 November 2006), 1.

⁸⁷ *Technical Issues Related to the Comprehensive Test Ban Treaty*, John P. Holdren, Chairman, National Academy of Sciences (Washington: National Academy Press, 2002), 34.

⁸⁸ Richard L. Garwin, *Testimony of Richard L. Garwin before the Energy and Water Development Appropriations Subcommittee, U.S. House of Representatives*, 17 March 2009 (Washington: Federal News Service, 2009).

The 2002 National Academy of Sciences report also revealed technical advances in the International Monitoring System that further support the verifiability of the CTBT. The National Academy of Sciences panel concluded that it would be difficult for states to conceal any nuclear explosions greater than one or two kilotons and that the value of such tests would be minimal.⁸⁹ As of September 2009, the IMS is over 70% complete with 249 certified monitoring facilities and 88 more in various stages of development.⁹⁰ Full installation of the IMS and the development of civilian seismic networks and national technical monitoring systems have improved the test ban verification capabilities to a much higher level than the stated requirement to detect a non-evasive test of one kiloton anywhere in the world.⁹¹ New advancements in seismometers, hydroacoustic, infrasound, radionuclide, and interferometric synthetic aperture radar satellite technologies further increase the likelihood of detection.⁹²

Very little of the benefit of a scrupulously observed CTBT regime would be lost in the case of clandestine testing within the considerable constraints imposed by the available monitoring capabilities. Those countries that are best able to successfully conduct such clandestine testing already possess advanced nuclear weapons of a number of types and could add little, with additional testing, to the threats they already pose or can pose to the United States. Countries of lesser nuclear test experience and design sophistication would be unable to conceal tests in the numbers and yields required to master nuclear weapons more advanced than the ones they could develop and deploy without any testing at all.⁹³

If the National Academy of Sciences' 2009 assessment is correct, there should be no reason to doubt the verifiability of the CTBT. The completion of an effective International Monitoring System, coupled with a successful Stockpile Stewardship Program, would take away two of the three main arguments presented by CTBT skeptics.

⁸⁹ *Technical Issues Related to the Comprehensive Test Ban Treaty*, 58.

⁹⁰ CTBTO, *Comprehensive Test Ban Treaty Fact Sheet*.

⁹¹ David Hafemeister, "The Comprehensive Test Ban Treaty: Effectively Verifiable," *Arms Control Today*, October 2008, available at <http://www.armscontrol.org/> (accessed 13 September 2009).

⁹² *Ibid.*

⁹³ *Technical Issues Related to the Comprehensive Test Ban Treaty*, 10–11.

D. DEVELOPMENTS IN THE ARGUMENT AGAINST RATIFICATION

Opponents of the Comprehensive Test Ban Treaty may acknowledge the technological advancements related to verification of compliance with the treaty, but remain skeptical about its value to U.S. national security. From their perspective, it would still be possible to evade detection and, more importantly, they doubt that the United Nations Security Council would take adequate measures to punish treaty violators. Some cite the unpunished violations of the NPT by North Korea as an example of an international treaty that is not enforced.⁹⁴

Some are concerned that the CTBT would leave open the possibility for different interpretations because it does not define what constitutes a nuclear test in precise technical terms. Some members of the Congressional Commission on the Strategic Posture of the United States opposed to CTBT ratification wrote as follows in their 2009 report:

[T]he treaty remarkably does not define a nuclear test. In practice this allows different interpretations of its prohibitions and asymmetrical restrictions. The strict U.S. interpretation precludes tests that produce nuclear yield. However, other countries with different interpretations could conduct tests with hundreds of tons of nuclear yield—allowing them to develop or advance nuclear capabilities with low-yield, enhanced radiation, and electro-magnetic-pulse.... With no agreed definition, U.S. relative understanding of these capabilities would fall further behind over time and undermine our capability to deter tactical threats against allies.⁹⁵

The congressional commission made the following unanimous recommendations to the Obama administration.

To prepare the way for Senate re-review of the CTBT, the administration should prepare a comprehensive net assessment of benefits, costs, and risks; secure P-5 agreement on a clear and precise definition of banned and permitted test activity; define a diplomatic strategy for entry into force; and prepare a budget that adequately funds the safeguards program.⁹⁶

⁹⁴ Paula A. DeSutter, "The Test Ban Treaty Would Help North Korea," *The Wall Street Journal*, 1 June 2009: A15.

⁹⁵ *America's Strategic Posture*, 83.

⁹⁶ *America's Strategic Posture*, 87.

This statement from a bipartisan commission indicates that the CTBT, in its present form, is unacceptable to many U.S. experts. A definition of what constitutes a nuclear test, agreed upon by the permanent members of the United Nations Security Council, may be a prerequisite for the U.S. Senate to provide its advice and consent to the ratification of the CTBT.

Stephen Rademaker, an Assistant Secretary of State for Arms Control, International Security and Non-Proliferation during the George W. Bush administration, also noted that disagreement on the definition of prohibited tests among the permanent five (P-5) members of the United Nations Security Council (China, France, Russia, the United Kingdom and the United States) could preclude CTBT ratification. He wrote, "Senate resistance to the CTBT certainly will increase if this issue cannot be resolved."⁹⁷ Senator Jon Kyl (R-Arizona) has already raised this argument for not acceding to the treaty:

The CTBT then [in 1999], as now, does not define what it purports to ban, which is nuclear-weapons testing. This leaves countries free to interpret the treaty (and act) as they see fit. Thus, if the U.S. ratified the treaty, it would be held to a different standard than other nations.⁹⁸

Senator Kyl voted against the CTBT in 1999 and promises to lead the opposition if the Obama administration resubmits the CTBT to the Senate for its advice and consent in the near future.

Skeptics regarding the CTBT are also resistant to the treaty because they continue to regard it as worthless or even detrimental to non-proliferation efforts. Members of the Congressional Commission on the Strategic Posture of the United States opposed to CTBT ratification argued that "There is no demonstrated linkage between the absence of U.S. testing and non-proliferation."⁹⁹ The Center for Security Policy's New Deterrent Working Group also produced a 2009 report, which stated that the aging of nuclear

⁹⁷ Stephen Rademaker, "Why Democrats Fail at Arms Control," *The Wall Street Journal*, 23 September 2009.

⁹⁸ Jon Kyl, "Why We Need To Test Nuclear Weapons," *The Wall Street Journal*, 21 October 2009.

⁹⁹ *America's Strategic Posture*, 83.

warheads will eventually erode the credibility of the U.S. strategic posture and that “a weak American nuclear posture in fact encourages proliferation more than a strong one.”¹⁰⁰

A lack of testing may result in degrading the safety and reliability of American nuclear weapons. Ratification of the treaty might also be perceived as a weakened resolve in the United States to use them in defense of allies, if necessary, and further undermine the credibility of extended deterrence. The New Deterrent Working Group noted that “some of our allies and friends who formerly relied on the U.S. ‘nuclear umbrella’ for protection could feel constrained to join these proliferators, in part as a result of their loss of confidence in our outdated arsenal and ability or will to use it.”¹⁰¹

The lack of comprehensive testing may eventually erode confidence in the reliability of U.S. nuclear weapons. Radioactive decay and chemical interactions within the explosive materials and other components eventually cause warheads to lose the properties required to produce nuclear explosions. Continuous refurbishments may also introduce changes to the warheads’ characteristics outside the original design limits. The current commander of the United States Strategic Command, Air Force General Kevin Chilton, commented on the “growing uncertainty about the stockpile’s future reliability” during his testimony to the Senate Armed Services Committee in 2009 and called the aging nuclear weapons stockpile and complex a “most urgent concern.”¹⁰²

The warhead pits analyzed by the 2006 JASON Report comprise one component of the weapons, but repeated refurbishments are causing an increasing amount of uncertainty regarding the operational reliability of other components of the weapons. As noted in the Final Report of the Congressional Commission on the Strategic Posture of the United States, “there are increasing concerns about how long such confidence will remain as the process of re-inspecting and remanufacturing these weapons continues.

¹⁰⁰ The New Deterrent Working Group, *U.S. Nuclear Deterrence in the 21st Century*, (Washington: Center for Security Policy Press, July 2009), 29.

¹⁰¹ New Deterrent Working Group, "Towards a New Deterrent."

¹⁰² U.S. Strategic Command, *Prepared Statement of General Kevin P. Chilton, Commander, United States Strategic Command, before the Committee on Armed Services on the United States Strategic Command*, United States Senate, Kevin P. Chilton (Washington: 19 March 2009).

Indeed, laboratory directors have testified that uncertainties are increasing.”¹⁰³ Skeptics regarding the treaty note that the CTBT would be of indefinite duration, and that it might be politically difficult—in domestic and international terms—to withdraw from the treaty.

E. SUMMARY

International events and political developments over the past decade have significantly changed the landscape for nuclear proliferation. Interpretations of these developments and the possible effects the Comprehensive Test Ban Treaty might have on future non-proliferation efforts are open to debate. For skeptics regarding the CTBT, maintaining the safety and reliability of U.S. nuclear weapons and the credibility of their deterrence value continue to outweigh the positive effects, if any, the treaty might have on the non-proliferation regime. Meanwhile, proponents of the treaty have made significant efforts to allay such concerns by claiming success in the Stockpile Stewardship Program’s ability to identify and remedy any defects in U.S. nuclear weapons. Proponents also hold that new technologies have improved and will continue to improve the Stockpile Stewardship Program as well as the International Monitoring System, mitigating the risks of the CTBT, and making it effectively verifiable.

¹⁰³ *America's Strategic Posture*: 41.

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V. ANALYSIS OF THE CURRENT DEBATE

A. THE UNITED STATES SENATE

The previous three chapters have shown that key issues in the Comprehensive Test Ban Treaty debate have not changed since 1999, but that technological advances have improved the International Monitoring System and the Stockpile Stewardship Program. Proponents of the CTBT tend to focus on the potential non-proliferation benefits of the treaty, while opponents of the CTBT tend to focus on the risks it might pose to the credibility of the U.S. nuclear deterrence posture. Changes in the geopolitical environment have also provided new arguments for both sides of the debate as events can be interpreted in different ways depending on one's perspective. To some, the CTBT now seems more verifiable, the U.S. nuclear stockpile more credible, and the prospect of bolstering non-proliferation efforts through ratification of the CTBT more necessary. To others, the treaty still seems unverifiable and/or unenforceable, the U.S. nuclear stockpile less credible, and the prospects of nuclear proliferation worsened by a weakening U.S. extended deterrence posture.

Some observers argue, however, that the voting of U.S. Senators is more likely to be influenced by partisan politics than by any technological advancements or developments in the international system.¹⁰⁴ This chapter discusses key political aspects of the debate and identifies potential tradeoffs that could be made to secure—or block—ratification of the Comprehensive Test Ban Treaty.

The biggest advantage for proponents of the CTBT is the current composition of the Senate with respect to political parties. It is hardly coincidental that Democratic senators provided 44 of the 48 votes supporting ratification of the CTBT in 1999 and that Republican senators provided all 51 votes against it. (Senator Robert Byrd, D-West

¹⁰⁴ Jonathan Medalia, *Comprehensive Test Ban Treaty: "Safeguards"*, Congressional Research Service Report for Congress, R40612 (Washington: Congressional Research Service, 3 June 2009), 20.

Virginia, voted “present.”)¹⁰⁵ Appendix A depicts the voting of all senators who considered providing advice and consent to ratification of the CTBT in 1999.

Advice and consent to ratification of an international treaty, such as the CTBT, requires a two-thirds majority from the U.S. Senate. The current U.S. Senate includes 58 Democrats and 40 Republicans.¹⁰⁶ Independent Democrat Joseph Lieberman from Connecticut and Independent Bernie Sanders from Vermont could each be expected to vote with the Democrats on this issue. Therefore, at least seven votes would be required from Republican senators to achieve a two-thirds majority to provide advice and consent to the ratification of the CTBT, as shown in Table 2. (The governor of Massachusetts appointed Paul Kirk, D-Massachusetts, as a temporary replacement in the Senate after the death of Senator Ted Kennedy, but a general election in January 2010 will determine a new incumbent through 2012.)¹⁰⁷ The current list of 40 Republican senators includes 23 that were serving in 1999 and voted to reject CTBT ratification, and none of the four that voted in support of CTBT ratification.

Incumbent Democrats in the Senate	57
Independents (Caucus with Democrats)	2
Senator Kennedy's Replacement	1
Additional Republican Votes Required	7
Votes Required for Treaty Ratification	67

Table 2. Hypothetical Voting Required by Current U.S. Senate to Ratify CTBT.

¹⁰⁵ Rob Mahoney, *Nuclear Stockpile Certification and Stewardship as Addressed in the Senate's October 1999 CTBT Deliberations*, IDA Document D-2426 (Alexandria: Institute for Defense Analysis, 2000), Table 2-1.

¹⁰⁶ *United States Senate Web site*, September 2009, available at <http://www.senate.gov/> (accessed 23 September 2009).

¹⁰⁷ John King, et al., "Paul Kirk to fill Kennedy's Senate seat," CNN, 24 September 2009.

Some Republican senators may see value in the improved International Monitoring System and the Stockpile Stewardship Program, but they are unlikely to be swayed by these improvements alone. They will still have concerns about verification or enforcement of the CTBT and its possible long-term effects on the U.S. deterrence posture and nuclear proliferation. The Minority Whip, Senator Jon Kyl (R-Arizona), recently remarked on his continued opposition to the CTBT:

There are good reasons why the test-ban treaty has not been ratified.... [I]t is simply not verifiable. It also failed because of an understandable reluctance on the part of the U.S. Senate to forgo forever a test program that could in the future be of critical importance for our defense and the defense of our allies.¹⁰⁸

Senator Kyl and other Republican senators have raised valid concerns over the long-term implications of the CTBT. Technological advancements in verification measures and stockpile stewardship will not address all of their concerns, but some might be persuaded by other means, such as safeguards.

B. SAFEGUARDS

Even if all major concerns were addressed on substantive grounds, some Republicans might view the CTBT as an important bargaining chip to use against the Democratic majority. The Republican Party could view ratification of the CTBT without any major concessions on the part of the Democrats as a missed opportunity. Some observers argue that “safeguards” might be an effective means to mitigate perceived risks associated with the treaty and that they might serve as an important bargaining range for the two parties to reach an acceptable compromise for at least two-thirds of the senators.¹⁰⁹

¹⁰⁸ Jon Kyl and Richard Perle, "Our Decaying Nuclear Deterrent," *The Wall Street Journal*, 30 June 2009: A13.

¹⁰⁹ Medalia, *Comprehensive Test Ban Treaty: "Safeguards,"* 1–2.

The safeguards package put forth by the Clinton administration during the 1999 debate included the following six provisions:

1. Ensure the safety and reliability of the nuclear stockpile with the Stockpile Stewardship Program.
2. Provide adequate resources to the nuclear laboratories and programs.
3. Maintain a nuclear testing capability.
4. Continue research and development programs for nuclear warheads.
5. Improve intelligence gathering and analytical capabilities.
6. Set conditions for withdrawal from the treaty.¹¹⁰

One problem with the safeguards presented in 1999, however, is that they contain no metrics to ensure adequate implementation.¹¹¹ Assessing compliance with the safeguards remains completely subjective.

Technically, the 1999 safeguards listed were never invoked because the CTBT was rejected. Nevertheless, similar safeguards were already in place from previous treaties and agreements. While the Senate alone provides advice and consent for the ratification of international treaties, the U.S. House of Representatives would also be involved in defining budget authorizations and appropriations for programs required by the treaty and its safeguards. A consistent complaint on both sides of the CTBT debate has been that the nuclear complex, including facilities and personnel, has received inadequate funding and is in need of immediate attention.¹¹² Some have proposed the creation of a “safeguard for the safeguards”—a congressionally mandated organization or committee to ensure that the safeguards continue to receive adequate resourcing.¹¹³

¹¹⁰ Medalia, *Comprehensive Test Ban Treaty: "Safeguards,"* 21–24.

¹¹¹ Jonathan Medalia, "Comprehensive Test Ban Treaty Safeguards," Presentation to the National Academy of Sciences Conference on the Comprehensive Test Ban Treaty Committee, 9 September 2009 (Washington: National Academy of Sciences, 2009).

¹¹² *America's Strategic Posture*, 50–51.

¹¹³ Medalia, "CTBT Safeguards," Presentation to NAS, 9 September 2009.

It is possible that some Republican senators with keen interests in the nuclear complex could be persuaded to vote in favor of the Comprehensive Test Ban Treaty if they were given adequate reassurances by safeguards to protect programs that directly affect their constituencies and support bases as well as U.S. national security interests. New weapons development programs or increased funding of the Stockpile Stewardship Program could serve this purpose. These types of concessions might be seen as contrary to the spirit of the CTBT or the NPT, and the compromise might not be worth the price to supporters of these treaties.

C. CONCLUSION

Debates about nuclear weapons and testing have been a part of American politics for over sixty years. The renewed interest in U.S. ratification of the Comprehensive Test Ban Treaty represents the latest round in these debates. The 1999 vote on the CTBT was divided along party lines in the U.S. Senate because of different perspectives regarding the verifiability of the treaty and its anticipated effects on U.S. nuclear deterrence and worldwide nuclear proliferation. Democrats generally viewed U.S. ratification of the CTBT as beneficial to U.S. national security because they hoped it would improve international relations and provide a boost to international non-proliferation efforts. They regarded the International Monitoring System as sufficient for deterring violations of the treaty. They also contended that the Stockpile Stewardship Program was good enough to forgo nuclear testing.

Republicans were generally much less certain about the prospects for maintaining international stability under the restrictions that the Comprehensive Test Ban Treaty would have imposed. They were not convinced that the Stockpile Stewardship Program and the International Monitoring System (or national technical means) could detect violations or that the United Nations Security Council would take action against violators in order to ensure long-term strategic stability. They contended that the CTBT would have weakened the U.S. nuclear deterrent more rapidly than it might have affected at least some other nuclear-armed states, upsetting the balance of power and thereby inviting nuclear proliferation.

Technological advancements in the last decade have improved the ability to monitor the degradation of existing nuclear weapons as well as the ability to detect underground nuclear tests around the world. Undoubtedly, these technologies and processes will continue to improve. What is not certain, however, is what changes will occur in the geopolitical environment or how others will interpret those changes. Proponents of the Comprehensive Test Ban Treaty are likely to continue to view it as crucial to nuclear non-proliferation efforts and effectively verifiable with minimal effects on the U.S. strategic deterrence posture. Meanwhile, opponents of the treaty are likely to continue to view it as unverifiable or unenforceable and detrimental to U.S. strategic deterrence and non-proliferation efforts.

Any future vote on the CTBT in the U.S. Senate will depend heavily on partisan politics, as it did in 1999. Technical advancements, significant as they may be, are not as likely to sway the opinions of senators as compromises made to address the risks of the treaty and to improve support for the U.S. nuclear complex. If it seeks to rally the required number of votes in the U.S. Senate, the Obama administration should conduct a study of which Republican senators could be influenced by concessions in the form of safeguards to more adequately address concerns about the U.S. nuclear stockpile, the credibility of U.S. extended deterrence, and international treaty compliance. Even with a reconstructed safeguards package, the outcome of a future vote on the CTBT in the U.S. Senate may be difficult to forecast.

APPENDIX

1999 CTBT VOTE IN THE U.S. SENATE¹¹⁴

Yeas (48)			Nays (51)			"Present" (1)
Akaka	Feinstein	Mikulski	Abraham	Fitzgerald	McCain	Byrd
Baucus	Graham	Moynihan	Allard	Frist	McConnell	
Bayh	Harkin	Murray	Ashcroft	Gorton	Murkowski	
Biden	Hollings	Reed	Bennett	Gramm	Nickles	
Bingaman	Inouye	Reid	Bond	Grams	Roberts	
Boxer	*Jeffords	Robb	Brownback	Grassley	Roth	
Breaux	Johnson	Rockefeller	Bunning	Gregg	Santorum	
Bryan	Kennedy	Sarbanes	Burns	Hagel	Sessions	
*Chafee	Kerrey	Schumer	Campbell	Hatch	Shelby	
Cleland	Kerry	*Smith (OR)	Cochran	Helms	Smith (NH)	
Conrad	Kohl	*Specter	Collins	Hutchinson	Snowe	
Daschle	Landrieu	Torricelli	Coverdell	Hutchison	Stevens	
Dodd	Lautenberg	Wellstone	Craig	Inhofe	Thomas	
Dorgan	Leahy	Wyden	Crapo	Kyl	Thompson	
Durbin	Levin		DeWine	Lott	Thurmond	
Edwards	Lieberman		Domenici	Lugar	Voinovich	
Feingold	Lincoln		Enzi	Mack	Warner	

*Denotes Republican vote of yea. (Senator Specter switched to Democrat in 2009).
Shaded boxes denote senators who are no longer in office.

¹¹⁴ Mahoney, *Nuclear Stockpile*, Table 2-1.

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